Characteristic and Difference between Self pollination and Cross pollination

Self pollination

1. It is the transfer of pollen grains from anther to the stigma of either the same or genetically similar flower.
2. Self pollination can occur even in closed flower.
3. External agency is not required for self pollination , except in case of geitonogamy.
4. The plants ultimately become homozygous.
5. Highly useful characters are preserved by self pollination.
6. Adaptability to changed environment is absent as self pollination does not produce variability.
7. It does not help in producing new races, varieties and species.
8. Self pollination produces pure lines.

Cross pollination

1. Cross pollination involves the transfer of pollen from anther of one flower to the stigma of a genetically different flower.
2. It occurs when he flowers are open.
3. An external agent is essential for carrying the pollen grains from anthers to the stigma.
4. The plants remain heterozygous.
5. Cross pollination is unable to preserve all the highly useful characters since they tend to get diluted.
6. Plants are better adapted to changed environment and struggle for existence due to introduction of variations.
7. Cross pollination is a mechanism of producing new races, varieties and even species.
8. It give rise to offspring having variations among themselves.

Factors promoting Self pollination

- Flower are bisexual with anthers and stigmas maturing at the same time.
- Stigma is situated directly below the anthers.

- In certain plants with bisexual flowers some flowers never open.Only self pollination can occur in those flowers.

Self pollination

Advantages

1. It maintains the parental characters or purity of the race indefinitely.
2. Self pollination is used to maintain pure lines for hybridisation experiments.
3. The plant does not need to produce large number of pollen grains.
4. Flowers do not develop devices for attracting insect pollinators.
5. It ensures seed production. Rather it is used as fail safe device for cross-pollinated flowers.
6. Self pollination eliminates some bad recessive characters.
7. It does not need any external agency.Hence shows greater re abilities.
8. It is necessary for species which are at great distant from each other.
9. It is advantageous to those plants which do not produce nectar and juices.
10. It is more economical as it does not consume energy for large population.
11. Pollen grains are not wasted.
12. Maintains the purity of races from one generation to another as no variation takes place.

Disadvantages

1. New useful characters are seldom introduced.
2. Vigour and vitality of the race decreases with prolonged self pollination.
3. Immunity to diseases decreases.
4. Variability and hence adaptability to changed environment are reduced.
5. The undesirable characters do not eliminate.
6. The offspring are readily susceptible to disease.
7. It does not reveal any variability so they may fail in long run.
8. Continuous self pollination can lead to death of species.

9. No variation are produced as a result of no evolution taken place.
10. Weak progeny are produced.

Cross Pollination

Advantages

1. A number of plants are self-sterile, that is, the pollen grains cannot complete growth on the stigma of the same flower due to mutual inhibition or incompatibility, e.g., many crucifers, solanaceous plants. Several plants are pre-potent, that is, pollen grains of another flower germinate more readily and rapidly over the stigma than the pollen grains of the same flower, e.g., Grape, Apple. Such plants of economic interest give higher yield only if their biotic pollinators like bees are available along-with plants of different varieties or descent though every other input like adequate irrigation, fertilizers or cultural care might have been already provided, e.g., Sunflower, Safflower, Mustard, Cucurbits, Almond, Cloves, Apple, Pear and related pomaceous plants.
2. Cross pollination introduces genetic recombinations and hence variations in the progeny.
3. Cross pollination increases the adaptability of the offspring towards changes in the environment.
4. It makes the organisms better fitted in the struggle for existence.
5. The plants produced through cross pollination are more resistant to diseases.
6. The seeds produced are usually larger and the offspring have characters better than the parents due to the phenomenon of hybrid vigour.
7. New and more useful varieties can be produced through cross pollination.
8. The defective characters of the race are eliminated and replaced by better characters.
9. Yield never falls below an average minimum.
10. Useful characters can be introduced in plants.
11. Undesirable characters can be elimated.
12. It increase the adaptability of varieties towarsds the new environment.
13. The seeds produced are usually large and more vigorous.
14. A phenomenon of hybrid vigour can be observed in this method.

Disadvantages

1. It is highly wasteful because plants have to produce a larger number of pollen grains and other accessory structures in order to suit the various pollinating agencies.
2. A factor of chance is always involved in cross .pollination.
3. It is less economical.
4. Some undesirable characters may creep in the race.
5. The very good characters of the race are likely to be spoiled.
6. It depends on external organisms for pollination to occur.
7. Due to cross pollination,some undesirable characters can remain in variety.
8. It fails in oxalis.
9. Pollen grains are lost.